Probability and Statistics

Name:- Ibrar Ahmad

ID; 7914

Sec - A

5th Semester

Mid - exam

date:- 30/11/2020

Ibrar Ahmad 7914 ①

Question No-01

The following are the scores made by three bastsmen A, B and C in a series of inings.

A	12	15	6	73	7	19	144	36	84	65
B	3	13	43	102	175	226	204	139	69	30
C	5	14	36	105	99	20	~~20~~ 15	96	13	45

(a) who is better as a run getter?

(b) who is more consistant player?

(c) which one player is more variat.

(d) find Emperical relation for player A.

→

Name:- Ibrar Ahmed; ID= 7914 ②

Sol:- from given data;

Batsman 'A'		Batsman B		Batsman C	
Score x_i	x_i^2	Score x_i	x_i^2	Score x_i	x^2
12	144	3	9	5	25
15	225	13	169	14	1296
6	36	43	1849	36	11025
73	5329	102	26244	105	9801
7	49	175	30625	99	400
19	36	220	48400	20	225
199	39601	204	41616	15	9216
36	1296	139	14321	96	169
84	7056	69	4761	13	196
65	4225	30	900	45	2025
$\sum x_i = 516$	$\sum x_i^2 = 54522$	$\sum x_i = 1058$	$\sum x_i^2 = 168921$	$\sum x_i = 448$	$\sum x_i^2 = 34378$

Ibrar Ahmad ; 7914

(a) Which player is better run getter?

A;

$$\text{mean Score} = \bar{x} = \frac{\sum x_i}{n} = \frac{516}{10} = 51.6$$

$$\bar{x} = 51.6$$

B;

$$\text{mean Score} = \bar{x} = \frac{\sum x_i}{n} = \frac{1058}{10} = 105.8$$

$$\bar{x} = 105.8$$

C;

$$\text{mean Score} = \bar{x} = \frac{\sum x_i}{n} = \frac{448}{10} = 44.8$$

$$\bar{x} = 44.8$$

As the average score of B is Greater than Batsman A and C, So B is better run getter.

Ibrar Ahmad ; ID = 7914 (4)

(b) Who is more Consistant player?

Coefficient of variation $= C.V = \frac{S_x}{\bar{x}} \times 100$

for P S.

for Batsman A:

$$S_x = \sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$

$$= \sqrt{\frac{5452.2}{10} - \left(\frac{516}{10}\right)^2}$$

$$= \sqrt{5452.2 - (51.6)^2}$$

$$S_x = 52.21$$

$$C.V = \frac{S_x}{\bar{x}} \times 100 = \frac{52.81}{51.6} \times 100$$

$$\boxed{C.V = 102.34\%}$$

$\longrightarrow$

~~fo~~

for Batsman B;

$$S_x = \sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$

$$= \sqrt{\frac{168924}{10} - \left(\frac{1058}{10}\right)^2}$$

$$= \sqrt{16892.4 - (105.8)^2}.$$

$$S_x = 75.49$$

$$C.V = \frac{S_x}{\bar{x}} \times 100 = \frac{75.49}{105.8} \times 100$$

$$\boxed{C.V = 71.351\%}$$

~~for Bat~~

$\longrightarrow$

for Batsman C_i

$$S_x = \sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$

$$= \sqrt{\frac{34378}{10} - \left(\frac{448}{10}\right)^2}$$

$$= \sqrt{3437.8 - (44.8)^2}$$

$$S_x = 37.82$$

$$C.v = \frac{S_x}{\bar{x}} \times 100$$

$$= \frac{37.82}{44.8} \times 100$$

$$\Rightarrow \boxed{C.v = 84.49\ \%}$$

$\longrightarrow$

(B) which player is more variad?

as Co-efficient of variation (C.V) for Batsman B is Smaller Than Batsman A and C, So Batsman B is more Variate.

(C) ~~who is the~~ which one player is more variate.

as Co-efficient of variation for Batsman A is greater than that for Batsmen B and C, So Batsman A is more variat.

(2) Emperical relation for player A?

player A Score

12

15

6

73

7

19

199

36

65

$mean = \bar{x} = \frac{\sum x_i}{n} = \frac{252}{10} = 25.2$

$mode = \cancel{\frac{n}{2} = \frac{10}{2} = 5^{th}}$ 1

$median = \frac{n}{2} = \frac{10}{2} = 5^{th}$

~~mod.~~ Emperical relation

$mode = 3\,median - 2\,mean$

$5 = 3(5) - 2(25.2)$

$5 = -35.4$

Ibrar Ahmad, 7914 ⑨ ④

Question No. 02

The following is the distribution of wages per thousand employees in a certain factory.

Classes	2–4	6–8	10–12	14–16	18–20	22–24	26–28
frequency	3	13	6	10	5	3	5

3

Calculate mean, Median and mode?

Discuss Symmetrical and Skewness characteristics.

→

Ibrar Ahmad ; ID 7914

Sol:-

class	class-boundries	F	x	f.x	c.f
2-4	3-5	3	3	9	3
6-8	5-9	13	7	91	16
10-12	9-13	6	11	66	22
14-16	13-17	10	15	150	32
18-20	17-21	5	19	95	37
22-24	21-25	3	23	69	40
26-28	25-29	5	27	135	45
30-32	29-33	3	31	93	48
34-36	33-37	2	35	70	50
		$\Sigma f = 50$		$\Sigma fx = 778$	

$$\text{mean} = \bar{x} = \frac{\sum fx}{f} = \frac{778}{50}$$

$$\Rightarrow \boxed{\bar{x} = 15.56}$$

mode = ?

$$\text{mode} = \frac{n^{th}}{2} \quad (\text{even})$$

$$\text{mode} = 25^{th}$$

In CF it is present in class 14—16.

So; as we know;

$$\text{mode} = l + \frac{f_m - f_0}{2f_m - f_0 - f_1} \times h$$

$h = 4$; $f_m = 32$, $l = 13$

$f_0 = 6$, $f_1 = 5$

$$\text{mode} = 13 + \frac{10-6}{20-6-5} \times 4$$

$$\Rightarrow \boxed{\text{mode} = 14.77}$$

median = ?

$$\text{median} = \frac{n^{th}}{2} \quad (\text{even})$$

$$= \frac{50}{2} = 25^{th}$$

in table c.f matched to that of class 14–16

as we know;

$$\text{median} = l + \frac{h}{f}\left(\frac{n}{2} - c.f\right)$$

$l = 13,\ h = 4,\ f = 10,\ c.f = 32$

$$\text{median} = 13 + \frac{4}{10}\left(\frac{50}{2} - 32\right)$$

$\rightarrow$ $\boxed{\text{median} = 10.2}$

Symmetrical and Skewness characteristics :-

Ibrar Ahmad ID, 7914

Q No. 03

Discuss merits and demerits of median and geometric mean?

Ans

Advantages of median:-

① It can be easily calculated.

② It is not affected by extreme values.

③ It can be calculated even there is frequency distribution.

Disadvantages.

① It is not regularously defined

② it is not capable of landing itself to further statistical treatment.

Advantages of Geometric Mean:-

① defined by a mathematical formula.

② It is not much affected by simplifying variability.

③ It is based on "all" observed values.

Disadvantages:-

① not easy to calculate.

② In case of negative values, it can not be completed at all.

THE END.